

We claim:

1. A medical device comprising:
a base member having a shape such that it
tracks the circumference of a native heart valve annulus;
5 and a bridge member extending from the base
member over the heart valve orifice, and supported by the
base member.
2. The medical device of claim 1, further
comprising a spanning material, the spanning material
10 suspended from the bridge member, and adjacent portions
of the base member, wherein the spanning material is
coupled to the bridge member and adjacent portions of the
base member by an attachment means.
3. The medical device of claim 1, wherein
15 the bridge member is manufactured from a super-elastic
material.
4. The medical device of claim 1, wherein
the base member is sized to change the shape of the
native valve annulus when attached to the native valve
20 annulus.
5. The medical device of claim 1, wherein
the spanning material is from a group consisting of
Nitinol, Dacron fabric, Polytetrafluoroethylene,
Silicone, Polyurethane, human pericardium, and animal
25 pericardium.
6. The medical device of claim 1, wherein
the attachment means is selected from a group consisting
of sewing, gluing, welding, and wrapping the spanning
material around itself.
- 30 7. The medical device of claim 1, further
comprising a framework coupled to the base member and
rising from the base member and into the surrounding
heart chamber, the reactive forces of the heart on the
framework transmitted through the framework and into the
35 annulus retainer.

8. The medical device of claim 7, wherein the framework is shaped to avoid the pulmonary veins.

9. A medical device comprising:

a base member shaped such that it tracks the 5 circumference of a native heart valve annulus,

a set of bridge members extending from the base member over the heart valve orifice, and supported by the base member,

10 and a spanning material suspended from each bridge member, and adjacent portions of the base member,

wherein the spanning material is coupled to the bridge member and adjacent portions of the base member by an attachment means.

15 10. The medical device of claim 9, wherein the bridge members are manufactured from a super-elastic material.

20 11. The medical device of claim 9, wherein the base member is sized to change the shape of the native valve annulus when attached to the native valve annulus.

25 12. The medical device of claim 9, wherein the spanning material is from a group consisting of Nitinol, Dacron fabric, Polytetrafluoroethylene, Silicone, Polyurethane, human pericardium, and animal pericardium.

13. The medical device of claim 9, wherein the attachment means is selected from a group consisting of sewing, gluing, welding, and wrapping the spanning material around itself

30 14. The medical device of claim 9, further comprising a framework coupled to the base member and rising from the base member and into the surrounding heart chamber, the reactive forces of the heart on the framework transmitted through the framework and into the 35 annulus retainer.

15. The medical device of claim 14, wherein the framework is shaped to avoid the pulmonary veins.

16. The medical device of claim 9, further including clips, the clips protrude from the base member
5 and press into the ventricular side of the annulus.

17. A medical device comprising:
a semicircular annular ring,
and a spanning material,
wherein the spanning material is coupled to
10 the semicircular annular ring.

18. The medical device of claim 17, wherein the semicircular annular ring is manufactured from a super-elastic material.

19. The medical device of claim 17, wherein
15 the semicircular annular ring is sized to change the shape of the native valve annulus when attached to the native valve annulus.

20. The medical device of claim 17, wherein
the spanning material is from a group consisting of
20 Nitinol, Dacron fabric, Polytetrafluoroethylene,
Silicone, Polyurethane, human pericardium, and animal pericardium.

21. A medical device comprising:
a circular annular ring,
25 and a spanning material,
wherein the spanning material is coupled to
the circular annular ring such that the spanning material spans a portion of the circular annular ring to function
as a coaptation surface for an functioning native
30 leaflet.

22. The medical device of claim 21, wherein the circular annular ring is manufactured from a super-elastic material.

23. The medical device of claim 21, wherein
35 the circular annular ring is sized to change the shape of

the native valve annulus when attached to the native valve annulus.

24. The medical device of claim 21, wherein the spanning material is from a group consisting of
5 Nitinol, Dacron fabric, Polytetrafluoroethylene, Silicone, Polyurethane, human pericardium, and animal pericardium.

25. A medical device comprising:
10 an outer hoop,
an inner hoop,
and struts that radiate between the inner and outer hoops,
wherein the struts are coupled to the outer and inner hoops.

15 26. The medical device of claim 25, wherein the medical device is manufactured from a super-elastic material.

20 27. The medical device of claim 25, wherein the medical device is sized to change the shape of the native valve annulus when attached to the native valve annulus.

28. A medical device, comprising:
25 a wire shaped to encircle the annulus of a heart valve, and radiate along the plane of the annulus both toward and away from the center of the valve orifice in a rhythmic pattern that enables the wire to contact both the valve leaflets and the adjacent heart walls.

29. The medical device of claim 28, wherein the wire is manufactured from a super-elastic material.

30 30. The medical device of claim 28, wherein the wire may be deployed from an intravascular catheter device.

31. A medical device, comprising:
35 a wire shaped to encircle the annulus of a heart valve, and radiate along the plane of the annulus

both toward and away from the center of the valve orifice in a rhythmic pattern that enables the wire to contact both the valve leaflets and the adjacent heart walls, the wire contacting the head walls forming a anchoring member
5 that provides a holding force to the retainer by embedding into adjacent tissue without damaging it.

32. The medical device of claim 31, wherein the wire is manufactured from a super-elastic material.

33. A medical device, comprising:
10 a heart chamber framework having two hoops positioned in approximately parallel planes and connected by vertical struts that are coupled to each hoop.

34. The medical device of claim 33, wherein the medical device is manufactured from a super-elastic
15 material.

35. A medical device comprising:
20 a heart chamber framework having a first hoop and a second hoop, the hoops positioned in parallel planes and connected by vertical struts that are coupled to each hoop,

and a neo-leaflet coupled to the first hoop, positioned to supplement or replace a native leaflet.

36. The medical device of claim 35, wherein the framework is manufactured from a super-elastic
25 material.

37. The medical device of claim 35, further comprising a second neo-leaflet coupled to the interior surface of the first hoop, positioned to supplement or replace a native leaflet.

38. A medical device comprising:
30 a leaflet retainer, the leaflet retainer formed of a wire that is shaped to extend over a leaflet and restrict the leaflet's movements upstream of blood flow,

35 and a framework, the framework formed of a

wire that is shaped to extend into the upstream heart chamber, and to contact the upstream chamber and transmit force from the chamber to the framework and then to the leaflet retainer,

5 wherein the leaflet retainer and framework are comprised of a continuous wire.

39. The medical device of claim 38, wherein the medical device is manufactured from a super-elastic material.

10 40. The medical device of claim 38, wherein the device may be deployed from an intravascular catheter device.

41. A medical device comprising:

15 a tulip-shaped wire form, wherein the tulip-shaped wire form has a framework and leaflet retainer, the leaflet retainer formed of a wire that is shaped to extend over one or more leaflets and restrict the leaflets movements upstream of blood flow,

20 and a framework, the framework formed of a wire that is shaped to extend into the upstream heart chamber, and to contact the upstream chamber and transmit force from the chamber to the framework and then to the leaflet retainer,

25 wherein the leaflet retainer and framework are comprised of a continuous wire.

42. The medical device of claim 41, wherein the wire form is manufactured from a super-elastic material.

43. A medical device comprising:

30 a twisted tulip-shaped wire form, wherein the twisted tulip-shaped wire form has a framework and leaflet retainer, the leaflet retainer formed of a wire that is shaped to extend over one or more leaflets and restrict the leaflets movements upstream of normal blood flow,

and a framework, the framework formed of a wire that is shaped to extend into the upstream heart chamber, and to contact the upstream chamber and transmit force from the chamber to the framework and then to the 5 leaflet retainer,

wherein the leaflet retainer and framework are comprised of a continuous wire.

44. The medical device of claim 43, wherein the wire form is manufactured from a super-elastic 10 material.

45. A medical device comprising:
a mesh-shaped wire form, wherein the mesh-shaped wire form has a framework and leaflet retainer, the leaflet retainer formed of a wire that is shaped to 15 extend over one or more leaflets and restrict the leaflets movements upstream of normal blood flow,

and a framework, the framework formed of a wire that is shaped to extend into the upstream heart chamber, and to contact the upstream chamber and transmit 20 force from the chamber to the framework and then to the leaflet retainer,

wherein the leaflet retainer and framework are comprised of a continuous wire.

46. The medical device of claim 45, wherein 25 the medical device is manufactured from a super-elastic material.

47. A medical device, comprising:
a corona-shaped wire form, wherein the corona-shaped wire form is formed of a single wire that radiates 30 between the valve base and the chamber apex and contacts the adjacent chamber walls.

48. The medical device of claim 47, wherein the medical device is manufactured from a super-elastic material.

35 49. A method for installing medical devices:

introducing a guidewire into a patient's blood vessel;

advancing the guidewire into the heart;

advancing a catheter over the guidewire, the 5 catheter pre-loaded with a medical device comprising:

a base member, the base member having a shape that tracks the circumference of a native heart valve annulus; and

10 a bridge member, the bridge member extending from the base member over the heart valve orifice, and supported by the base member;

advancing the catheter within the vessel so that the medical device reaches its desired position within the heart;

15 releasing the medical device into the desired location within the heart;

positioning the medical device within the desired location of the heart;

and withdrawing the catheter from the patient.